INTEGRATING SPECIES DISTRIBUTIONAL, CONSERVATION PLANNING, AND INDIVIDUAL BASED POPULATION MODELS: A CASE STUDY IN CRITICAL HABITAT EVALUATION FOR THE NORTHERN SPOTTED OWL

Authors: Jeffrey R. Dunk, Brian Woodbridge, Nathan H. Schumaker, Betsy Glenn, Dave LaPlante, and Brendan White

Background / Question / Methods

As part of the ongoing northern spotted owl recovery planning effort, we evaluated a series of alternative potential critical habitat scenarios using a species-distribution model (MaxEnt), a conservation-planning model (Zonation), and an individual-based population model (HexSim). Our approach was designed to permit a comparison of estimated owl population responses to multiple hypothetical habitat conservation scenarios. Each scenario represented a different set of assumptions regarding critical habitat size/spatial arrangement, trends in relative habitat suitability, and barred owl impacts. A total of 98 "what if" scenarios were evaluated using HexSim, and the results were used to forecast relative spotted owl population responses to the candidate conservation strategies.

Results / Conclusions

Based on our HexSim model results, we were able to recommend a critical habitat network that, in our estimation, would allow spotted owl populations to become stable (rather than the currently-estimated decrease), remain well-distributed throughout their current range, and would keep the population resilient in spite of future uncertainty regarding habitat trends and barred owl impacts. Our recommended critical habitat network is more efficient than most of the alternative candidate scenarios we evaluated. The modeling framework we developed and used, in particular our methods for the application of HexSim, should be readily transferrable to other reserve planning studies. Finally, our study illustrates a method for quantifying the relative risk of alternative conservation scenario design decisions while there is still flexibility in the planning process.